

We claim:

1. A user interface comprising:
  - a substrate comprising an attachment surface, the substrate partially defining a cavity adjacent the attachment surface and defining a fluid channel fluidly coupled to the cavity;
  - a tactile layer comprising a deformable region and an undeformable region, the undeformable region of a first thickness and coupled to the attachment surface at an attachment point, the deformable region disconnected from the substrate and including a portion of a second thickness different than the first thickness, the tactile layer defining an outer tactile surface opposite the substrate;
  - a displacement device configured to displace fluid through the fluid channel and into the cavity to transition the deformable region between:
    - a retracted setting defining a first tactile formation at the tactile surface, wherein a portion of the deformable region extends into the cavity and; and
    - an expanded setting defining a second tactile formation, different than the first tactile formation, at the tactile surface, wherein a portion of the deformable region is elevated out of the cavity; and
  - a touch sensor coupled to the substrate and configured to detect a user touch on the tactile surface.
2. The user interface of claim 1, wherein the undeformable region of the tactile layer is joined to the attachment surface at a plurality of attachment points.
3. The user interface of claim 2, wherein the plurality of attachment points define a border between the deformable and undeformable regions.
4. The user interface of claim 2, wherein each of the plurality of attachment points are substantially adjacent and form a continuous seal around the perimeter of the cavity.
5. The user interface of claim 1, wherein the deformable region comprises a first portion of a first pliability and a second portion of a second pliability different than that of the first portion.
6. The user interface of claim 1, wherein the cavity comprises a first wall of a particular draft angle, wherein a portion of the deformable region extending into the cavity comprises a second wall of the particular draft angle, and wherein, in the retracted setting, the second drafted wall contacts the first drafted wall.
7. The user interface of claim 6, wherein the first wall is configured to substantially support the second wall to limit inward deformation of the deformable region due to a force applied to the tactile surface.
8. The user interface of claim 1, wherein the tactile surface is continuous across the deformable and undeformable regions, and wherein the deformable region is flush with the undeformable region in the retracted setting.
9. The user interface of claim 1, wherein the deformable region is of varying thickness, and wherein, in the expanded setting, a portion of the tactile surface at the deformable region is substantially planar and offset from the tactile surface at the undeformable region.
10. The user interface of claim 1, wherein the tactile layer at the deformable region is of uniform thickness substantially greater than the first thickness.
11. The user interface of claim 1, wherein a portion of the attachment surface extends into the cavity.
12. The user interface of claim 1, wherein the substrate further comprises a support surface, within the cavity, configured to substantially limit inward deformation of the deformable region due to a force applied to the tactile surface.
13. The user interface of claim 12, wherein the deformable region extends into the cavity and is configured to contact the support surface in the retracted setting.
14. The user interface of claim 12, wherein the substrate further defines a fluid conduit configured to communicate fluid through the support surface and toward the deformable region.
15. The user interface of claim 12, wherein the attachment surface and the support surface are continuous and adjacent.
16. The user interface of claim 12, wherein the attachment surface and the support surface are planar.
17. The user interface of claim 1, wherein, in the retracted setting, the tactile surface at the deformable region is offset above a portion of the undeformable region by a first distance, and wherein, in the expanded setting, the tactile surface at the deformable region is offset above a portion of the undeformable region by a second distance different than the first distance.
18. The user interface of claim 1, wherein, in the expanded setting, the tactile surface of the deformable region defines one of: a button, a ridge, a ring, a slider, and a pointing stick.
19. The user interface of claim 1, wherein, in the retracted setting, the tactile surface of the deformable region defines one of: a valley, a ridge, an edge, and a guide.
20. The user interface of claim 1, further comprising a reservoir coupled to the displacement device and configured to contain fluid.
21. The user interface of claim 1, wherein the touch sensor is a capacitive touch sensor.
22. The user interface of claim 1, further comprising a display coupled to the substrate and configured to visually output an image through the tactile surface.
23. The user interface of claim 22, wherein the display is configured to output the image that is an input key substantially aligned with the deformable region.
24. The user interface of claim 1, wherein the displacement device is a pump.
25. The user interface of claim 1, wherein the substrate further comprises a second attachment surface and partially defines a second cavity adjacent the second attachment surface, wherein the tactile layer further comprises a second deformable region disconnected from the substrate and of a third thickness greater than the first thickness, wherein the displacement device is further configured to displace fluid into the second cavity to transition the second deformable region between a retracted setting and an expanded setting.
26. The user interface of claim 25, wherein the displacement device selectively transitions the deformable region and the second deformable region between the retracted and expanded settings.
27. The user interface of claim 1 incorporated into an electronic device selected from the group consisting of: an automotive console, a desktop computer, a laptop computer, a tablet computer, a television, a radio, a desk phone, a mobile phone, a PDA, a personal navigation device, a personal media player, a camera, and a watch.